



APPENDIX 6A:

TABLES OF CHEMICAL COMPOSITION OF PARTICULATE MATTER

TABLE 6A-1a. SUMMARY OF PM_{2.5} STUDIES

EAST	REF	NOTE	WEST	REF	NOTE	CENTRAL	REF	NOTE
Smoky Mtn.	1		Boise	5	d	Albuquerque	5	d
Shenandoah	1		Tarrant CA	8	a	St. Louis	6,7	
Camden	2	b	Five Points CA	8	a	Steubenville	6,7	
Philadelphia	3		Riverside CA	8	a	Harriman	6,7	
Deep Creek	4	c	San Jose	8	a	Portage	6,7	
Roanoke	5	d	Honolulu	8	a	Topeka	6,7	
Raleigh	5	d	Winnemucca NV	8	a	Inglenook AL	8	a
Watertown	6,7		Portland	8	a	Braidwood IL	8	a
Hartford	8	a	Seattle	8	a	Kansas City KS	8	a
Boston	8	a	Southern California	9,31	g,h	Minneapolis	8	a
Res.Tr. Pk.	8	a	San Joaquin Valley	10	i	St. Louis	8	a
Charlotte	20	e	Phoenix	11	j	Kansas City MO	8	a
Allegheny Mtn.	44		Nevada	12	f	Akron	8	a
Allegheny Mtn.	45-50					Cincinnati	8	a
Laurel Hill	45-50					Buffalo	8	a
						Dallas	8	a
						El Paso	8	a
						Denver	13	
						Urban Denver	14	m
						Non-urban Denver	14	aa
						Chicago	15	
						Houston	16	
						St.Louis	17	
						Harriman	17	
						St. Louis	18	k
						Steubenville	21	
						Brownsville	24	n
						Ontario	37	l

TABLE 6A-1b. SUMMARY OF COARSE FRACTION STUDIES

EAST	REF	NOTE	WEST	REF	NOTE	CENTRAL	REF	NOTE
Smoky Mtn.	1	o	Tarrant CA	8	a,o	St. Louis	6,7	o,p
Shenandoah	1	o	Five Points CA	8	a,o	Steubenville	6,7	o,p
Camden	2	b	Riverside CA	8	a,o	Harriman	6,7	o,p
Philadelphia	3	ab	San Jose	8	a,o	Portage	6,7	o,p
Watertown	6,7	o,p	Honolulu	8	a,o	Topeka	6,7	o,p
Hartford	8	a,o	Winnemucca NV	8	a,o	Inglenook AL	8	a,o
Boston	8	a,o	Portland	8	a,o	Braidwood IL	8	a,o
Res.Tr. Pk.	8	a,o	Seattle	8	a,o	Kansas City KS	8	a,o
Allegheny Mtn.	44		Southern California	9,31	g	Akron	8	a,o
Allegheny Mtn.	45-50		San Joaquin Valley	10	i	Cincinnati	8	a,o
Laurel Hill	45-50		Phoenix	11	j	Buffalo	8	a,o
						Dallas	8	a,o
						El Paso	8	a,o
						Denver	13	o
						Chicago	15	s
						Houston	16	o
						St. Louis	17	
						Harriman	17	
						St. Louis	18	k,r
						Brownsville	24	n
						Ontario	37	l

TABLE 6A-1c. SUMMARY OF PM₁₀ STUDIES

EAST	REF	NOTE	WEST	REF	NOTE	CENTRAL	REF	NOTE
Smoky Mtn.	1	o,q	Tarrant CA	8	a,q	St. Louis	6,7	p,q
Shenandoah	1	o,q	Five Points CA	8	a,q	Harriman	6,7	p,q
Camden	2	b	Riverside CA	8	a,q	Steubenville	6,7	p,q
Philadelphia	3	ab	San Jose CA	8	a,q	Portage	6,7	p,q
Kingston	6,7	p,q	Honolulu HI	8	a,q	Topeka	6,7	p,q
Watertown	6,7	p,q	Winnemucca NV	8	a,q	Inglenook AL	8	a,q
Hartford	8	a,q	Portland OR	8	a,q	Braidwood IL	8	a,q
Boston	8	a,q	Seattle	8	a,q	Kansas City KS	8	a,q
Res.Tr. Pk.	8	a,q	Southern California	9,31	g,h	Minneapolis	8	a,q
Allegheny Mtn.	44		San Joaquin Valley	10	i	St. Louis	8	a,q
Allegheny Mtn.	45-50		Phoenix	11	j	Kansas City MO	8	a,q
Laurel Hill	45-50		San Fran. Bay	29	v	Akron	8	a,q
			San Jose	29	w	Cincinnati	8	a,q
			Palm Springs	38	t	Buffalo	8	a,q
			Pocatello, ID	39		Dallas	8	a,q
			Tuscon	40	u	El Paso	8	a,q
			Rillito, AZ	42		Denver	13	q
						Chicago	15	s
						Houston	16	q
						St.Louis	17	
						Harriman	17	
						St. Louis	18	x
						Brownsville	24	
						Utah Valley	26	
						Ontario	37	1
						SE Chicago, IL	41	
						Ohio	43	y

FOOTNOTES FOR TABLES 6A-1a THROUGH 6A-2c

- a. Inhalable Particle Network (IPN) Data. Only represents days of elevated concentrations—dichot filter loadings >50 µg/cm².
 - b. Data from Site 28 only.
 - c. Average of all 6-h samples.
 - d. Avg over all day/nite samples.
 - e. Average of all 12-h samples at 2 incin. sites and 2 background sites. Only XRF values which exceeded associated uncertainties more than half the time at all four sites were included.
 - f. Average from Sparks site and Reno site.
 - g. Sampling only during intensive episodes.
 - h. Averages based on 12-h day/nite samples. There were 59 sampling days at Claremont and 23 sampling days at Long Beach.
 - i. Avg over all sites: Stockton, Crow's Landing, Fresno, Kern, Fellows, and Bakersfield.
 - j. Average of Central Phoenix, West Phoenix, and Scottsdale sites.
 - k. Avg of RAPS site 106.
 - l. Average from Walpole, Windsor 1, and Windsor 2 sites.
 - m. Avg of 3 urban sites: Auraria, Federal, and Welby.
 - n. Median VAPS values from Central site.
 - o. 2.5-15 µm.
 - p. Coarse concentrations may be 30% or more underestimated due to losses from handling filters.
 - q. PM₁₅.
 - r. 2.4-20 µm.
 - s. No upper size cutoff on VAPS inlet.
 - t. Average of Palm Springs and Indio, CA.
 - u. Avg. of Downtown Tuscon, Orange Grove, Craycroft, and Corona de Tuscon sites.
 - v. Mean of annual avgs (1988-1992) from ~9 sites in Alameda, San Francisco, and Santa Clara counties.
 - w. 24-h average of day/nite concentrations at two sites in San Jose.
 - x. PM₂₀. Average from RAPS site 106.
 - y. Avg. of Follansbee, Mingo, Sewage Plant, Steubenville, and WTOV Tower sites in Ohio.
 - z. Average of urban sites: Fresno, Bakersfield and Stockton.
 - aa. Average of nonurban sites: Brighton and Tower.
 - ab. Castor Avenue site only.
-
-

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c. BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
1	1) Smoky Mtn. 2) Shenandoah Valley 3) Abastumani Mtn.	1) Sept 1978 2) Jul-Aug 1980 3) Mar 24-Jul 1979	F+C(2.5-15), EC, OC, SO ₄ ⁻ , Nitrate. 12-h samples.	1) Comparison of avg F&C composition for 3 sites.	
2	Philadelphia - 3 sites	Jul 14-Aug 13 1982	F+C(2.5-10), EC, OC, SO ₄ ⁻ , NO ₃ ⁻ 12-h (0600-1800) and (1800-0600).	1) F+C composition at site 28. 2) 9-source CMB source app. for site 28. 3) Mass Balance for 3 sites.	
3	Philadelphia	Jul 25-Aug 14 1994	Fine mass, elements, OC, EC, SD, uncert., from 4 sites	1) Measured PM _{2.5} mass, OC, EC, elements, SD, unc. at each site.	
4	Deep Creek Lake	August, 1983	Day/nite sampling (1000-2200, 2200-1000). Dichots. FM, CM, OC, EC, Gases, FP nitrate	1) Mean FP mass, OC, EC, nitrate, elements stratified by day/nite/all.	
5	1) Albuquerque 2) Raleigh 3) Boise 4) Roanoke	1) Dec 1984-Mar 1985 2) Jan 1985-Mar 1985 3) Dec 1986-Mar 1987 4) Oct 1988-Feb 1989	F & C (2.5-10) + Carbon, EOM, VOCs. 12-h samples, Day/night: 0700-1900, 1900-0700.	1) Mean comp. of F mass, EC, OC EOM, at 4 sites. 2) daytime/nighttime/24-havgs for key species at 4 sites.	No CP data presented; Sampling only in winter; focus on woodstove impact
6	Portage, Topeka,Harriman, Kingston, St. Louis, Steubenville, Watertown	1979-1981 Multi-season	FP & IP(2.5-15). 24-h (midnite-midnite), every other day. No Carbon data.	1) Mean+SE by city for F+C mass, metals. 2) Box-line plots by city showing means and percentiles for F+C mass, sulfate, Cl. 3) Time-series plots of F+C mass & tot Sulfate. 4) Data summaries only--no raw data.	Source of info on geographical and temporal PM composition variability.

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
7	Harvard 6-cities	1) 1977-1985 TSP 2) 1979-1985 PM ₁₀ & PM _{2.5} 3) 1979-1984 Sulfate		1) Table of Mean Air pollution values for 6 cities: TSP, Inhalable, Fine, Sulfate. No comp.	
8	IPN study ~25 sites.	Throughout 1980.	F+C(2.5-15), 24-h sample every 6th day. <u>Only moderately or highly-loaded samples were included.</u> No Carbon.	1) F+C mass for ~25 sites. 2) F+C mass, composition for 22 sites (No carbon)	
9	Los Angeles (SCAQS) 40 locations <i>Aerosol composition</i>	Summer (11 episode days) and fall (7 episode days) 1987	Sequential 4-, 5-, and 7-h PM _{2.5} and PM ₁₀ on summer episode days, and 4- and 6-h samples in fall. Mass, elements, ions, sulfate, nitrate, Carbon, ammonium.	1) Avg & Max PM ₁₀ and PM _{2.5} mass, ions, comp, Cv, Ce stratified into summer and fall. 2) Plots of temp and spatial variations of PM _{2.5} and PM ₁₀ , PM _{2.5} nitrate. 3) C _{tot} /EC for some sites	Temp and spatial variations of PM _{2.5} and PM ₁₀
10	San Joaquin Valley 6 sites <i>Aerosol Composition</i>	Jun 1988-Jun 1989	24-h PM & PM every 6 days. Mass, elements, ions (K ⁺ , SO ₄ ⁻ , NH ₄ ⁺ , Na ⁺), EC, OC	1) Summary of annual geometric avg, arith. avg, max 24-h PM ₁₀ and PM _{2.5} mass by site. 2) Ann. Avg Mass and comp. for PM ₁₀ and PM _{2.5} by site.	PM ₁₀ highest in winter and dominated by F mass; C >50% of PM ₁₀ in summer and fall. Data show spatial and temporal variations of PM ₁₀ and PM _{2.5}

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
11	Phoenix PM Study	Oct. 1989 - Jan. 1990	F&C mass, elements, uncertainties from 6 sites		
12	Phoenix 4 sites Also comparison aerosol data from Denver, Reno, and Sparks	Sept. 1989 - Jan. 1990	6-h samples, 2x/day, (0600-1200, 1300-1900) PM ₁₀ & PM _{2.5} : mass, elements, HNO ₃ , SO ₂ , NH ₃ , FP NO ₃ ⁻ and SO ₄ ⁼ , ionic species, OC, EC.	1) temporal variation of PM _{2.5} mass at 4 sites. 2) Mean, SD, & Max: PM _{2.5} , EC, OC, NO ₃ , SO ₄ ⁼ , NH ₄ ⁺ and elements for 3 Phoenix sites 3) Same for Denver (11/87-1/88) 4) Same for Reno (11/86-1/87) 5) Same for Sparks (11/86-1-87)	Moudi size-resolved (0-5.6 μm in 9 bins) mass, NO ₃ , SO ₄ ⁼ , OC, EC.
13	Denver	Jan. 11-30, 1982	Dichotomous sampler, OC, EC, nitrate, sulfate	1) Measured PM _{2.5} and Coarse, elements, OC, EC, nitrate, day/night samples; light extinction.	Source apportionment for F&C particles and extinction.
14	Denver (SCENIC)	Nov. 1987-Jan. 1988	2x daily (0900-1600, 1600-0900). PM _{2.5} mass, comp, sulfate, nitrate, OC, EC, ionic species, gases	1) Avg, SD, Min, Max PM _{2.5} mass for 6 sites. 2) Avg, SD, Min, Max, for PM _{2.5} mass, ionic species, EC, OC, elements for 3 sites. 3) Source profiles 4) SCE for 4 sites by day and night	Source Apportionment study
15	Chicago	July, 1994	VAPS & Dichot. FM, CM, OC, EC, elements, SO ₂ , HONO, HNO ₃ .	1) Avg VAPS mass, SD, uncert. for F & C, OC, EC.	
16	Houston	Sept. 10-19, 1980	Dichotomous sampler: 0.1-2.5, 2.5-15. 4 sites. Consecutive 12 h samples.	1) Average F&C mass, elements, Carbon, NH ₄ ⁺ , NO ₃ ⁻ , Sulfate	Source apportionment.
17	St. Louis & Harriman	Sept. 1985 - Aug. 1986	Daily F & C (2.5-10μm). Also SO ₂ , NO ₂ , and O ₃ .	1) Mean, SD, range for PM ₁₀ , PM _{2.5} , SO ₄ ⁼ , H ⁺ , SO ₂ , NO ₂ , O ₃ for both sites.	

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
11	Phoenix PM Study	Oct. 1989 - Jan. 1990	F&C mass, elements, uncertainties from 6 sites		
12	Phoenix 4 sites Also comparison aerosol data from Denver, Reno, and Sparks	Sept. 1989 - Jan. 1990	6-h samples, 2x/day, (0600-1200, 1300-1900) PM ₁₀ & PM _{2.5} ; mass, elements, HNO ₃ , SO ₂ , NH ₃ , FP NO ₃ and SO ₄ ⁻ , ionic species, OC, EC.	1) temporal variation of PM _{2.5} mass at 4 sites. 2) Mean, SD, & Max: PM _{2.5} , EC, OC, NO ₃ , SO ₄ ⁻ , NH ₄ ⁺ and elements for 3 Phoenix sites 3) Same for Denver (11/87-1/88) 4) Same for Reno (11/86-1/87) 5) Same for Sparks (11/86-1-87)	Moudi size-resolved (0- 5.6 μm in 9 bins) mass, NO ₃ , SO ₄ ⁻ , OC, EC.
13	Denver	Jan. 11-30, 1982	Dichotomous sampler, OC, EC, nitrate, sulfate	1) Measured PM _{2.5} and Coarse, elements, OC, EC, nitrate, day/night samples; light extinction.	Source apportionment for F&C particles and extinction.
14	Denver (SCENIC)	Nov. 1987-Jan. 1988	2x daily (0900-1600, 1600-0900). PM _{2.5} mass, comp, sulfate, nitrate, OC, EC, ionic species, gases	1) Avg, SD, Min, Max PM _{2.5} mass for 6 sites. 2) Avg, SD, Min, Max, for PM _{2.5} mass, ionic species, EC, OC, elements for 3 sites. 3) Source profiles 4) SCE for 4 sites by day and night	Source Apportionment study
15	Chicago	July, 1994	VAPS & Dichot. FM, CM, OC, EC, elements, SO ₂ , HONO, HNO ₃ ,	1) Avg VAPS mass, SD, uncert. for F & C, OC, EC.	
16	Houston	Sept. 10-19, 1980	Dichotomous sampler: 0.1-2.5, 2.5-15.4 sites. Consecutive 12 h samples.	1) Average F&C mass, elements, Carbon, NH ₄ ⁺ , NO ₃ , Sulfate	Source apportionment.
17	St. Louis & Harriman	Sept. 1985 - Aug. 1986	Daily F & C (2.5-10μm). Also SO ₂ , NO _x , and O ₃ .	1) Mean, SD, range for PM ₁₀ , PM _{2.5} , SO ₄ ⁻ , H ⁺ , SO ₂ , NO ₂ , O ₃ for both sites.	

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
18	St. Louis	Jul 1976-Aug 1976 (St.Louis)	F(<2.4) & C (2.4-20) 6-12 hr. No Carbon. RAPS data for St. Louis exist for May 1975-Mar 1977 but were not in this article	1) 2-mo avg of F+C mass, metals, sulfate, for one site. 2) F+C composition of selected samples (different sites) during events. 3) CMB apportionment of F+C fractions to 6 components (crustal shale, crustal limestone, ammonium sulfate, motor vehicles, steel, paint). 4) Plots of intercity variations in source component concentrations	1) Crude CMB source apportionment of FP with 6 sources.
19	1) Albuquerque 2) Denver	1) Jan 3-4, 1983 2) Jan 19-20, 1982	F & C (2.5-10) + Carbon, Nitrate & Sulfate (IC) 12-h samples, Day/Night: 0700-1900, 1900-0700.	1) Mean daytime and nighttime comp. of F&C, EC, OC, nitrate, sulfate, for each site. 2) Source app. of Denver winter FP composition.	More complete source app results in Lewis & Enfield paper.
20	Charlotte (2 incin sites and 2 control sites).	Apr 30-Jun 4, 1992 & Sept 21-28, 1992.	VAPS F&C + Acid gases. no carbon. 12-h samples	1) Mean ambient FP conc. + XRF unc. at 4 sites 2) CMB results for FP.	
21	Steubenville	Jan-Dec 1984	24-h, F+C. No Carbon	1) avg F mass + comp. 2) avg source contributions by SRFA 3) SRFA-derived source profiles	
22	Review of PM studies	1984-1990	PM ₁₀	1) SCE's for PM ₁₀ mass for ~15 studies	ambient PM ₁₀ data sources are cited but no data is presented
23	Phoenix	Jan 5-27, 1983	F(<2.8)+C(>2.8). 1800-0800 12 h samples.	1) avg F+C nighttime comp, mass, Cv,Ce, gases. 2) CMB of FP	
24	Brownsville -- residential and central sites.	Spring+Summer 1993	1)FP MES indoor/outdoor 2) VAPS central site 3) Dichot central site	1) min, med, max for fine MES comp+mass 2) min, med, max F+C comp, mass for VAPS and dichot at central site	No <u>avg</u> values, only <u>median</u> .

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
25	Sparks, Reno, Verdi, NV (SNAPS)	Apr 1986-Mar 1987	1) PM & PM every 6th day. 24-h samples. Also diurnal sampling.	1) Seasonal avg SCE for PM ₁₀ at 3 sites. No raw data (geological, motor veh, construction, vegetative, sulfate, nitrate, OC, EC)	
26	Utah Valley (Linden site)	Apr 1985-Dec 1989	1) PM for 1736 days. Also, SO ₂ , NO ₂ , O ₃ , acidity data.	1) avg PM ₁₀ = 47 $\mu\text{g}/\text{m}^3$. sd=38, (min,max)=(1,365 $\mu\text{g}/\text{m}^3$). 2) freq distribution of PM10 mass.	no comp. data. Highest pm10 during winter.
27	Santa Clara County	1980-1986: only Nov, Dec, Jan data used.	"COH" --coefficient of haze. [COH/PM10=1.87 or 1.64 (1985 and 1986)].	1) Plots of COH vs daily mortality for 2-yr periods.	Examines relation between mortality and COH
28	San Joaquin Valley 6 sites	Jun 1988-Jun 1989	24-h PM & PM every 6 days. Mass, elements, ionic species, Carbon,	1) Table of ann. avg. SCE to PM10 and PM2.5 for data above, by site	For PM10 Mass, Sulfate, and Nitrate data, see ref 27.
	<i>Source apportionment</i>				
29	SF Bay Area 2 sites	Dec 16, 1991-Feb 24, 1992	12-h daily day & nite (0600-1800, 1800-0600) PM ₁₀ samples. Mass, elements, ions (K ⁺ , Cl, SO ₄ ⁻ , NH ₄ ⁺ , Na ⁺) Carbon, ammonium.	1) Table of ann. avg. PM ₁₀ mass, sulfate, nitrate statistics at 3 sites for 1988-1992 2) Avg. & Max day & nite PM ₁₀ mass, ions, comp, EC, OC, for both sites 3) Source profiles 4) SCE pie charts for each site.	1. Highest PM ₁₀ mass during Nov, Dec, Jan. 2. Wood combust. contributes ~45% of PM ₁₀ .
30	Los Angeles (SCAQS) 40 locations	Summer (11 episode days) and fall (7 episode days) 1987	Sequential 4-, 5-, and 7-h PM _{2.5} and PM ₁₀ on summer episode days, and 4- and 6-h samples in fall.	1) Source profiles 2) PM ₁₀ SCE for summer and fall. 3) Diurnal SCE to PM ₁₀ at each site.	Data show diurnal changes in SCE for PM ₁₀ mass.
	<i>CMB Source Apport.</i>		Mass, elements, ions, sulfate, nitrate, Carbon, ammonium.		

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
31	1) Claremont (SCAQS) 2) Long Beach (SCAQS)	1) Summer 1987 (59d) 2) Fall 1987 (23d)	Continuous 12-h PM_{10} and $\text{PM}_{2.5}$. Mass, elements, ionic species, EC, OC	1) Mean, SD, & Max: PM_{10} , FPM, CPM, EC, OC, NO_3^- , SO_4^{2-} , NH_4^+ . 2) Mean values of above species during intensive and non-intensive periods. 3) Day/nite values of above 4) PM_{10} and $\text{PM}_{2.5}$ mass balances 5) Summary of EC, OC data.	
32	CADMP -- 8 sites: Gasquet, Fremont, Bakersfield, Yosemite, Sequoia, Long Beach, Los Angeles, Azusa	Summer 1988	2 samples every 6th day. 0600-01800, 1800-0600. $\text{PM}_{2.5}$, PM_{10} . Mass, ionic species,	1) Graph of avg PM_{10} & $\text{PM}_{2.5}$ mass and ratio at 8 sites 2) Graphs of PM_{10} & $\text{PM}_{2.5}$ ionic concentrations.	Ask Chow/Watson for raw data.
33	Central California -53 sites in SF Bay area, Sacramento Valley, San Joaquin Valley, North and South Central Coast, Mountain Counties	1) 1989 2) July & August, 1988	PM_{10} every 6th day. Sulfate and nitrate measured on a subset of these samples.	1) 1989 Max and Avg PM_{10} mass, Sulfate, and Nitrate for ~53 sites. 2) Summertime 1988 Avg, SD, and Max PM_{10} and $\text{PM}_{2.5}$ Mass, comp, OC, EC, Ionic species, for 3 SJVAQS sites. [Annual data summary is in ref 20].	
34	Birmingham	1986-1989	Daily 24-h PM mass. Also Ozone data. No composition data.	1) Table of percentile points of the distribution of PM_{10} , O_3 , T, DewPoint, Pneumonia, Chronic obstructive pulmonary disease. 2) Avg PM_{10} and O_3 by season	Aside: Indoor/Outdoor ratios of 0.63 for PM_{10} were reported in Tucson.
35	Philadelphia	1973-1980	24-h (midnite-midnite) TSP. No composition data.	1) Table of percentile points of the distribution of TSP, SO_2 , T, DewPoint, Mortality.	
36	State College, PA	summer 1990	Indoor, outdoor, personal SO_2 , H ₂ , and NH_3		Validation of personal exposure models

6A-12

APPENDIX FOR TABLES 6A-1a THROUGH 6A-2c (cont'd). BIBLIOGRAPHY FOR PM STUDIES

Ref No.	Sites	Dates	Types of Samples	Data	Comments
37	Southern Ontario 3 sites	Jan.-Nov., 1991	24-h, midnite-midnite, every 6th day. PM ₁₀ dichot sampler.	1) Avg mass, elements, for F&C fractions, for 3 sites. No OC, EC.	
38-43	Miscellaneous sites 14 sites	1984-1990	PM concentrations.	1) Measured PM ₁₀ mass and avg source contributions (up to 10 source categories).	Primary reference is Ref 10.
44	Allegheny Mtn. SW PA elev. 838 m	July 24-Aug. 10 1977	Filters, impactors, gas samplers, day/night	Aerosol mass, elements, H ⁺ , NH ₄ ⁺ , SO ₄ ⁻ , NO ₃ ⁻ , total C, size distributions, b _{scat} , L _v , gases	Strong aerosol H ⁺ found, associated with SO ₄ ⁻
45-50	Allegheny Mtn. and Laurel Hill, SW PA separation 35.5 km	Aug. 5-Aug. 28, 1983	Filters, dichotomous samplers, impactors, denuders, gas analyzers, day/night	Fine, coarse, and PM ₁₀ mass, elements, EC, H ⁺ , NH ₄ ⁺ , SO ₄ ⁻ , NO ₃ ⁻ , size distributions, CN counts, b _{scat} , b _{abs} , L _v , HNO ₃ and other gases, rain, dew, 2-site correlation	Coordinated with Deep Creek Lake experiment, Ref. 4, ≈60 km to SSW

References:

- 6A-13
1. Stevens et al. (1984)
 2. Dzubay et al. (1988)
 3. Pinto et al. (1995)
 4. Vossler et al. (1989)
 5. Stevens et al. (1993)
 6. Spengler and Thurston (1983)
 7. Dockery et al. (1993)
 8. Davis et al. (1984)
 9. Chow et al. (1994a)
 10. Chow et al. (1993a)
 11. Desert Research Institute (1995)
 12. Chow et al (1990)
 13. Lewis et al. (1986);
Lewis and Dzubay (1986)
 14. Watson et al. (1988)
 15. Stevens, R. K. (1995) [Unpublished
data].
 16. Johnson et al. (1984)
 17. Dockery et al. (1992)
 18. Dzubay (1980)
 19. Stevens (1985)
 20. Mukerjee et al. (1993)
 21. Koutrakis and Spengler (1987)
 22. Chow et al. (1993b)
 23. Solomon and Moyers (1986)
 24. Ellenson et al. (1994)
 25. Chow et al. (1988)
 26. Pope et al. (1992)
 27. Fairley (1990)
 28. Chow et al. (1992b)
 29. Chow et al. (1995a)
 30. Watson et al. (1994a)
 31. Wolff et al. (1991)
 32. Ashbaugh et al. (1989)
 33. Chow et al. (1994b);
Watson et al. (1994b)
 34. Schwartz (1994)
 35. Schwartz and Dockery
(1992)
 36. Suh et al. (1993)
 37. Conner et al. (1993)
 38. Kim et al. (1992)
 39. Houck et al. (1992)
 40. Chow et al. (1992a)
 41. Vermette et al. (1992)
 42. Thanukos et al. (1992)
 43. Skidmore et al. (1992)
 44. Pierson et al. (1980b)
 45. Pierson et al. (1986)
 46. Japar et al. (1986)
 47. Pierson et al. (1987)
 48. Keeler et al. (1988)
 49. Pierson et al. (1989)
 50. Keeler et al. (1990)

TABLE 6A-2a. PM_{2.5} COMPOSITION FOR THE EASTERN UNITED STATES (μg/m³)

Ref	1	1	2(b)	3	4(c)	46, 49, 50	46, 49, 50	5(d)	5(d)	6,7	8(a)	8(a)	8(a)
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Allegheny Mtn.	Laurel Hill	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13, 1982	7/25-8/14/94	8/83	8/5-28/83	8/6-27/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	0-12-24	0-12-24	6-18-6	9-9	4x daily	day/night	day/night	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	~10	~10	12	12	24	24	24	24
Number	12	28	50	21	98	44	39	NR	NR	354	2	1	3
Mass	24.00	27.00	28.70	32.18	40.00	49	46	30.30	19.90	14.90	26.75	34.80	28.77
OC	2.22	0.44	2.05	4.51	1.45	2	2	10.00	7.30				
EC	1.10	1.12	1.87	0.76	0.18	1.2	1.4	0.50	1.50				
Nitrate	0.30		<0.48		0.57	0.5	0.6						
Sulfate	12.00	13.60	11.20			17	18			5.85			
Acidity ^s						9	10			20.300			
Al	<0.054	<0.105	0.053	0.114		0.058	0.048	0.009	0.176		0.035		0.073
As	<0.003	<0.003	0.001		0.001	0.0005	0.0006	0.001	0.002		0.002		0.002
Ba						0.0048	0.0033						
Br	0.018	0.008	0.029	0.009	0.005	0.004	0.004	0.028	0.005	0.088	0.036	0.020	0.007
Ca	0.016	0.035	0.040	0.058	0.048	0.027	0.023	0.018	0.047	0.041	0.070	0.070	0.035
Cd			0.002			0.0004	0.0004						
Cl	<0.010	0.010	0.003	0.026		0.061	0.038	0.007	0.053	0.084			
Cr			0.002			0.0016	0.0011			0.001		0.003	0.004
Cu	0.003	0.005		0.007		0.0012	0.0020	0.020	0.007		0.043	0.035	0.016
Fe	0.028	0.054	0.091	0.127	0.058	0.046	0.062	0.044	0.114	0.074	0.125	0.121	0.120
K	0.040	0.061	0.101	0.060	0.044	0.041	0.040	0.159	0.177		0.171	0.096	0.148
Mg			0.023			0.011	0.009						
Mn		0.006	0.003	0.003	0.0032	0.0038	0.003	0.012	0.004	0.007	0.001	0.003	
Mo		0.001			0.0037	0.0031	0.001	0.001					
Na		0.146	0.070	0.034	0.036	0.034							
Ni		0.011	0.007		0.0009	0.0011				0.009	0.010	0.012	0.001

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE EASTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	1	1	2(b)	3	4(c)	44, 45-50	45-50	5(d)	5(d)	6,7	8(a)	8(a)	8(a)
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Allegheny Mtn.	Laurel Hill	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13 '82	7/25-8/14/94	8/83	8/5-28/83	8/6-27/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	00-12-24	00-12-24	6-18-6	9-9	4x daily	day/night	day/night	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	~10	~10	12	12	24	24	24	24
Number	12	28	50	21	98	44	39	NR	NR	354	2	1	3
P				0.015		0.013	0.019					0.009	0.042
Pb	0.097	0.052	0.249	0.019	0.048	0.035	0.039	0.096	0.027	0.329	0.510	0.285	0.106
Rb						0.0005	0.0002						
S	3.744	4.539	4.200	3.251	6.700	5.9	5.5	1.729	1.177	1.800	2.219	3.869	2.835
Sb				0.079		0.001	0.0006	0.0006					
Se	0.001	0.001	0.002	<0.002	0.003	0.0018	0.0020	0.002	0.002	0.001	0.001	0.001	0.002
Si	0.038	0.116	0.103	0.165	0.150	0.23	0.21	0.076	0.077	0.100	0.177	0.144	0.350
Sn			<0.012										
Sr			<0.002			0.0026	0.0027						
Ti	<0.006	<0.010	<0.027	<0.042		0.0041	0.0047				0.002		
V	<0.004	<0.010	0.013	<0.013	0.001	0.0019	0.0017	0.003	0.004	0.022	0.017	0.020	
Zn	0.009	0.011	0.082	0.041	0.013	0.010	0.012	0.015	0.083		0.079	0.046	0.018

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE WESTERN UNITED STATES (μg/m³)

Ref	9(g)	9(g)	10(i)	11(j)	5(d)	12(f)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	6/88-6/89	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4,5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
Mass	41.10	90.20	29.89	29.37	35.70	56.92	57.05	31.80	35.18	36.28	21.10	9.68	37.18	10.70
OC	8.27	18.46	4.87	10.10	12.70	19.97								
EC	2.37	7.28	3.24	7.47	1.70	15.17								
Nitrate	4.34	22.64	8.17	3.60		2.43								
Sulfate	9.41	4.38	3.00	1.33		1.67								
Acidity ^s														
Al	0.035	0.250	0.152	0.130	0.102	0.275	0.177	0.239	0.036	0.123	1.127	0.361	0.581	0.002
As	0.022	0.015		<0.020	0.002	0.001				0.001			0.012	0.006
Ba	0.015	0.043	0.012	<0.106		0.013								
Br	0.013	0.065	0.010	0.011	0.014	0.033	0.102	0.015	0.037	0.188	0.017	0.006	0.093	0.019
Ca	0.022	0.335	0.096	0.170	0.026	0.215	0.455	0.150	0.301	0.089	1.024	0.243	0.154	0.037
Cd		<0.007		<0.018										
Cl	0.093	0.453	0.094	0.365	0.122	0.145		0.004	0.009	0.050	0.518		0.021	
Cr	0.022	0.025	0.003	0.003	0.001	0.002	0.002	0.001		0.003	0.004		0.009	0.002
Cu	0.063	0.273	0.096	0.015	0.011	0.010	0.047	0.024	0.040	0.043	0.018	0.026	0.072	0.024
Fe	0.099	0.557	0.180	0.216	0.022	0.310	0.316	0.216	0.127	0.148	0.726	0.231	0.270	0.098
K	0.041	0.217	0.188	0.207	0.145	0.280	0.186	0.244	0.120	0.248	0.371	0.149	0.218	0.080
Mg	0.024	0.075												
Mn	0.016	0.043	0.006	0.023	0.002	0.015	0.032	0.005	0.007	0.006	0.020	0.003	0.052	0.004
Mo				<0.006	0.002									
Na	0.202	0.466												
Ni	0.005	0.007	0.016	0.003		0.006	0.003	0.025	0.007	0.006	0.002	0.001	0.027	0.006

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE WESTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	9(g)	9(g)	10(i)	11(j)	5(d)	12(f)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	06/88-06/89	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4, 5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
P	0.060	0.046	0.007	<0.051		0.041		0.007		0.013	0.002		0.017	0.006
Pb	0.038	0.185	0.029	0.039	0.045	0.115	0.619	0.087	0.376	0.891	0.071	0.042	0.422	0.215
Rb			0.001	<0.0025		0.001								
S	2.832	1.998	1.242	0.437	0.603	0.765	2.578	1.129	1.653	0.852	0.313	0.358	1.944	0.831
Sb			<0.002	<0.033										
Se	0.013	0.011	0.001	<0.002	0.001			0.001	0.001				0.001	0.001
Si	0.052	0.520	0.460	0.430	0.069	0.860	0.583	0.656	0.234	0.292	2.363	0.914	0.377	0.092
Sn			<0.015	<0.028										
Sr	0.019	0.028	0.002			0.004								
Ti	0.005	0.060	0.017	<0.030		0.043	0.010	0.005		0.063	0.009	0.005		
V	0.006	0.007	0.015	<0.016	0.001	0.009		0.006	0.003	0.002	0.001		0.014	
Zn	0.090	0.298	0.078	0.056	0.019	0.033	0.095	0.016	0.029	0.061	0.011	0.011	0.081	0.059

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^{\$}Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE CENTRAL UNITED STATES (μg/m³)

Ref	5(d)	13	14(m)	14(aa)	15	16	6,7	17	6,7	6,7	6,7	8(a)	8(a)
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7&17	7&17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
Mass	20.60	20.73	19.67	10.35	13.57	38.60	20.80	21.00	24.60	11.00	12.50	27.16	32.03
OC	13.20	7.11	7.25		5.39	5.68							
EC	2.10	2.15	4.41		1.31	1.42							
Nitrate		2.22	3.96		0.59								
Sulfate		2.06	1.55		14.61	8.10	8.70			4.95	4.40		
Acidity ^s						36.1	36.1			10.5	11.6		
Al	0.077	0.394	0.037		0.046	0.123						0.155	0.082
As		<0.002			<0.003	<0.005						0.025	0.001
Ba		0.031			<0.091	0.048							
Br	0.085	0.103	0.018		0.004	0.055	0.038		0.044	0.011	0.045	0.070	0.040
Ca	0.059	0.047	0.058		0.045	0.155	0.150		0.120	0.045	0.250	0.332	0.326
Cd		0.006	0.005		<0.029	<0.003							
Cl	0.036	0.052	0.141		0.011	0.032	0.021		BQL	0.027	0.031		0.003
Cr		<0.009	0.003		<0.005	<0.005						0.001	0.002
Cu		0.010	0.017		0.011	0.028						0.036	0.032
Fe	0.045	0.079	0.111		0.089	0.162	0.120		0.097	0.049	0.090	0.134	0.281
K	0.074	0.079	0.077		0.061	0.119						0.127	0.408
Mg					0.012								
Mn		0.011	0.012		0.005	0.014	0.017		0.010	0.003	0.004	0.004	0.037
Mo					<0.002								
Na					0.022	<0.38							
Ni		0.003	0.002		<0.001	0.004	BQL		BQL	BQL	BQL	0.001	0.001

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE CENTRAL UNITED STATES (μg/m³)

Ref	5(d)	13	14(m)	14(aa)	15	16	6,7	17	6,7	6,7	6,7	8(a)	8(a)
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7&17	7&17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
P		0.043			0.008	0.028							0.008
Pb	0.237	0.326	0.075		0.027	0.465	0.180		0.194	0.061	0.163	0.481	0.309
Rb		<0.003				<0.002							
S	0.507	0.709	0.642		1.321	4.834	2.500		2.400	1.400	1.100	0.823	2.655
Sb			0.004		<0.042	0.006							
Se			0.001		<0.001	<0.002	0.002		0.002	0.001		0.002	0.001
Si	0.076	0.277	0.272		0.074	0.210	0.120		0.200	0.075	0.190	0.436	0.685
Sn			0.006		<0.049	<0.005							
Sr		<0.003	0.001			<0.002							
Ti		<0.027	0.009		<0.029	<0.014							0.003
V					<0.009	<0.008	BQL		BQL	BQL	BQL		
Zn	0.007	0.046	0.031		0.052	0.084						0.055	0.133

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE CENTRAL UNITED STATES (μg/m³)

Ref	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	18(k)	6,7	17	6,7
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24
Number	1	8	6	3	7	2	14	4	5	NR	306	311
Mass	28.20	25.66	15.50	16.77	36.09	29.80	38.75	28.93	23.06	34.00	19.00	17.70
OC												
EC												
Nitrate												
Sulfate										7.40	8.00	10.94
Acidity ^s										10.3	9.7	25.2
Al	0.089	0.091			0.046	0.062	0.192	0.111	0.119	0.203		
As		0.003	0.004		0.007	0.012	0.013	0.009	0.033	0.003	0.002	
Ba										0.020		
Br	0.003	0.027	0.047		0.064	0.039	0.024	0.003	0.223	0.025	0.132	0.078
Ca	0.084	0.519	0.103		0.213	0.110	0.062	0.218	0.691	0.090	0.132	0.101
Cd										0.004		
Cl										0.087	0.052	0.092
Cr		0.004	0.001		0.002	0.010	0.003	0.002	0.005		0.006	
Cu	0.024	0.032	0.035		0.021	0.037	0.024	0.026	0.043	0.018	0.029	
Fe	0.071	0.189	0.087		0.140	0.609	0.174	0.671	0.248	0.076	0.275	0.190
K	0.052	0.311	0.092		0.142	0.268	0.136	0.310	0.125	0.126	0.261	0.590
Mg												
Mn	0.001	0.006	0.005		0.006	0.085	0.011	0.033	0.015	0.002	0.036	0.021
Mo												0.029
Na												
Ni	0.001	0.002	0.001		0.001	0.006	0.004	0.008	0.002	0.002	0.004	0.003
												0.005

6A-20

TABLE 6A-2a (cont'd). PM_{2.5} COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	8(a)	18(k)	6,7	17	6,7
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24
Number	1	8	6	3	7	2	14	4	5	NR	306	311
P		0.013			0.059	0.043	0.060	0.018	0.020	0.001		
Pb	0.041	0.180	0.308	0.369	0.412	0.343	0.359	1.066	0.277	0.688	0.327	0.216
Rb												
S	2.060	1.816	0.907	0.763	3.419	2.876	3.706	1.514	2.333	4.655	2.100	4.700
Sb										0.006		
Se	0.001	0.001	0.001		0.008	0.005	0.005		0.002	0.004	0.002	0.005
Si	0.220	0.434	0.169	0.177	0.522	0.328	0.241	0.442	0.170	0.458	0.160	0.290
Sn										0.009		
Sr										0.002		
Ti		0.004			0.009	0.003		0.007		0.112		
V							0.001	0.002		0.002	BQL	0.011
Zn	0.011	0.034	0.045	0.046	0.150	0.053	0.078	0.054	0.023	0.101		

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2b. COARSE PARTICLE COMPOSITION FOR THE EASTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	1(o)	1(o)	2(b)	3(ab)	4(c)	46,49,50	46,49,50	5(d)	5(d)	6,7(o,p)	8(a,o)	8(a,o)	8(a,o)
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Allegheny Mtn.	Laurel Hill	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13 '82	7/25-8/14/94	8/83	8/5-28/83	8/6-27/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	NR	NR	6-18-6	NR	4x daily	day/night	day/night	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	~10	~10	12	12	24	24	24	24
Number	12	28	50	21	98	44	39	NR	NR	354	2	1	3
Mass	5.60	7.40	11.40	8.42		15	13			9.30	27.85	105.60	8.17
OC				<3.00									
EC				0.42									
Nitrate				0.57									
Sulfate		0.78	<0.90							0.65			
Acidity ^s													
Al	<0.300	0.311	0.550	0.325		0.39	0.39				1.875	3.458	0.606
As	<0.001	<0.002				0.0002	0.0002					0.001	
Ba						0.007	0.006						
Br	0.005	0.003	0.015	0.003		0.0011	0.0011			0.022	0.046	0.025	0.003
Ca	0.322	0.304	0.360	0.421		0.27	0.28			0.209	0.864	1.069	0.086
Cd		<0.006				0.0004	0.0003						
Cl	<0.012	0.179	0.069	0.047		0.044	0.039			0.305	0.302	0.301	
Cr		<0.009				0.0014	0.0015				0.008	0.004	0.002
Cu	<0.005	0.006		0.014		0.0016	0.0025				0.026	0.023	0.010
Fe	0.118	0.158	0.490	0.352		0.24	0.24			0.276	1.070	1.612	0.182
K	0.108	0.129	0.151	0.100		0.11	0.10				0.310	0.533	0.068
Mg				0.104		0.060	0.061						
Mn		<0.006	0.011	0.006		0.0063	0.0068			0.006	0.021	0.029	0.003
Mo						0.0026	0.0021						
Na				0.136		0.054	0.044						
Ni	<0.002	<0.003	0.004	0.002		0.0008	0.0009				0.005	0.022	

6A-22

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE EASTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	1(o)	1(o)	2(b)	3(ab)	4(c)	46,49,50	46,49,50	5(d)	5(d)	6,7(o,p)	8(a,o)	8(a,o)	8(a,o)
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Allegheny Mtn.	Laurel Hill	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13 '82	7/25-8/14/94	8/83	8/5-28/83	8/6-27/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	NR	NR	6-18-6	NR	4x daily	day/night	day/night	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	~10	~10	12	12	24	24	24	24
Number	12	28	50	21	98	44	39	NR	NR	354	2	1	3
P				0.027		0.006	0.007				0.033	0.016	
Pb	0.014	0.009	0.054	0.013		0.007	0.007			0.076	0.171	0.177	0.013
Rb						0.0004	0.0005						
S	<0.560	<0.711	0.230	BQL		0.59	0.56			0.200	0.428	0.502	0.223
Sb			0.181			0.0002	0.0002						
Se	<0.0006	<0.001	<0.0015	BQL		0.0003	0.0003						
Si	0.580	0.813	1.610	0.933		1.48	1.41			1.000	4.517	6.760	1.387
Sn		<0.009											
Sr			0.002			0.0029	0.0025						
Ti	0.018	0.017	0.065	0.030		0.029	0.027			0.094	0.154	0.021	
V			0.007	BQL		0.0011	0.0010			0.008	0.008		
Zn	<0.004	0.006	0.030	0.052		0.010	0.011			0.054	0.054	0.007	

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m₃.

NR = not reported.

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE WESTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	9(g) *	9(g) *	10(i) *	11(j)	5(d)	12(f)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	6/88-6/89	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4.5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
Mass	26.30	8.50	44.17	33.09			43.85	92.57	71.03	30.40	25.80	55.74	80.38	25.30
OC	3.34	4.89	5.71	4.46										
EC	0.82	1.21	2.38	0.84										
Nitrate	5.13	4.86	2.38	0.86										
Sulfate	1.87	1.01	0.62	0.37										
Acidity ^s														
Al	0.723	0.597	3.418	2.539			2.230	7.078	3.513	1.930	1.865	6.564	6.351	2.294
As	BQL	0.004		<0.002									0.002	0.002
Ba	0.055	0.084	0.040	<0.077										
Br	0.003	0.006	0.006	0.002			0.047	0.004	0.028	0.062	0.006	0.004	0.028	0.014
Ca	0.563	0.854	0.961	1.929			4.088	1.636	4.781	0.682	0.957	1.934	1.305	0.548
Cd				<0.016										
Cl	1.026	0.426	0.393	0.194				0.022	0.164	0.430	0.938	0.176	0.176	0.228
Cr	0.002	0.017	0.007	0.008			0.005	0.006	0.005	0.006	0.005	0.006	0.010	0.003
Cu	BQL	BQL	BQL	0.021			0.030	0.013	0.021	0.028	0.007	0.017	0.037	0.017
Fe	0.737	1.635	1.453	1.259			0.941	3.059	1.888	1.066	0.658	1.764	1.789	0.903
K	0.196	0.243	0.632	0.669			0.255	1.193	0.961	0.260	0.294	1.051	0.587	0.151
Mg	0.311	0.212												
Mn	0.017	0.021	0.031	0.032			0.035	0.050	0.042	0.021	0.014	0.041	0.056	0.018
Mo				<0.005										
Na	1.431	0.052					0.003	0.012	0.006	0.008	0.003	0.002	0.009	0.001
Ni	BQL	BQL	BQL	0.003										

6A-24

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE WESTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	9(g) *	9(g) *	10(i) *	11(j)	5(d)	12(f)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	6/88-6/89	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4.5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
P	0.127	0.053	0.052	0.038			0.002	0.148	0.144	0.032			0.011	
Pb	0.046	0.066	0.032	0.022			0.167	0.018	0.113	0.228	0.022	0.021	0.115	0.077
Rb				0.003										
S	0.520	0.264	0.222	0.178			0.310	0.293	0.720	0.257	0.258	0.215	0.427	0.121
Sb				<0.030										
Se	BQL	BQL		<0.002										
Si	1.988	1.642	7.577	7.013			5.208	16.001	7.544	5.214	3.766	11.903	12.128	4.332
Sn				<0.026										
Sr	BQL	BQL	0.012	0.014										
Ti	0.072	0.106	0.130	0.121			0.083	0.272	0.182	0.086	0.067	0.164	0.186	0.091
V	BQL	0.003	BQL	<0.014				0.007					0.004	
Zn	0.024	BQL	0.016	0.034			0.052	0.016	0.030	0.044	0.008	0.015	0.038	0.034

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^{\$}Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	5(d)	13(o)	14(m)	14(ab)	15(s)	16(o)	6,7(o,p)	17	6,7(o,p)	6,7(o,p)*	6,7(o,p)*	8(a,o)	8(a,o)
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7 & 17	7 & 17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
Mass		35.73			14.97	24.80	11.70	9.00	10.80	7.20	13.90	49.05	40.43
OC						3.10							
EC													
Nitrate						1.63							
Sulfate		0.39				0.91				0.35	0.40		
Acidity ^s													
Al	2.900				0.223	1.093						2.748	2.426
As					<0.0013	<0.006						0.012	
Ba	0.058				<0.038	0.091							
Br	0.024				0.007	0.036	0.014		0.012	0.003	0.010	0.033	0.021
Ca	0.658				0.716	2.780	1.650		0.840	0.335	2.150	3.632	2.598
Cd	0.012				<0.012	<0.006							
Cl	1.235				0.036	0.366	0.029		0.018	0.056		0.043	
Cr	<0.009				<0.0024	0.007						0.003	0.004
Cu	0.008				0.006	0.018						0.047	0.027
Fe	0.954				0.344	0.604	0.570		0.263	0.181	0.490	0.812	1.193
K	0.648				0.101	0.170						0.496	0.309
Mg					0.106								
Mn	0.021				0.008	0.021	0.021		0.018	0.006	0.016	0.023	0.041
Mo					<0.0017								
Na					<0.017	<0.74							
Ni	0.005				<0.0007	0.004	0.001		BQL	0.001	0.001	0.001	0.002

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	18(k,r)	6,7(o,p)*	17	6,7(o,p)*
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24	24
Number	1	8	6	3	7	2	14	4	5		306	311	499
Mass	28.70	41.67	30.85	41.67	34.81	33.15	44.57	32.63	33.76	28.00	12.40	9.90	16.90
OC													
EC													
Nitrate													
Sulfate											0.70		1.86
Acidity\$													
Al	1.931	2.284	2.191	2.284	2.509	2.910	2.808	1.294	3.837	1.209			
As	0.002	0.003	0.001	0.003	0.003			0.006	0.001	0.001			
Ba										0.034			
Br	0.003	0.029	0.022	0.029	0.025	0.017	0.012	0.051	0.021	0.047	0.021		0.010
Ca	1.406	3.754	1.571	3.754	1.431	1.312	2.550	3.436	1.784	2.817	1.499		1.023
Cd										0.001			
Cl		0.530	0.293	0.530	0.572	0.103	0.728	0.029	0.053	0.257	0.093		0.211
Cr	0.002	0.004	0.002	0.004	0.014	0.002	0.015	0.005	0.001	0.009			
Cu	0.020	0.015	0.022	0.015	0.018	0.014	0.022	0.023	0.014	0.014			
Fe	0.656	0.979	0.744	0.979	1.640	0.883	2.040	0.720	0.587	1.218	0.580		1.610
K	0.303	0.361	0.310	0.361	0.324	0.363	0.206	0.210	0.291	0.392			
Mg													
Mn	0.017	0.025	0.026	0.025	0.044	0.021	0.078	0.020	0.017	0.035	0.019		0.039
Mo													
Na													
Ni	0.001	0.002	0.001	0.002	0.005	0.003	0.009	0.002	0.002	0.005	0.002		0.004

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	5(d)	13(o)	14(m)	14(ab)	15(s)	16(o)	6,7(o,p)	17	6,7(o,p)	6,7(o,p) [*]	6,7(o,p) [*]	8(a,o)	8(a,o)
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7 & 17	7 & 17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
P		0.113			0.027	<0.1							0.022
Pb		0.099			0.005	0.124	0.057			0.040	0.013	0.040	0.191
Rb		0.005				<0.003							
S		<0.48			0.043	<1.29	BQL		BQL	BQL	BQL	0.249	0.314
Sb					<0.017	<0.009							
Se						<0.0006							0.001
Si		7.460			0.739	2.990	1.880		1.700	0.905	2.310	5.377	6.312
Sn					<0.021	<0.009							
Sr		0.009				<0.008							
Ti		0.090			0.019	0.036						0.077	0.116
V					<0.004	<0.03							
Zn		0.039			0.038	0.058						0.057	0.055

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	18(k,r)	6,7(o,p)	17	6,7(o,p)	*
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81	
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24	
Duration (h)	24	24	24	24	24	24	24	24	24	24	24	24	
Number	1	8	6	3	7	2	14	4	5	306	311	499	
Mass	28.70	41.67	30.85	41.67	34.81	33.15	44.57	32.63	33.76	28.00	12.40	9.90	16.90
OC													
EC													
Nitrate													
Sulfate											0.70		1.86
Acidity ^s													
Al	1.931	2.284	2.191	2.284	2.509	2.910	2.808	1.294	3.837	1.209			
As	0.002	0.003	0.001	0.003	0.003			0.006	0.001	0.001			
Ba										0.034			
Br	0.003	0.029	0.022	0.029	0.025	0.017	0.012	0.051	0.021	0.047	0.021		0.010
Ca	1.406	3.754	1.571	3.754	1.431	1.312	2.550	3.436	1.784	2.817	1.499		1.023
Cd										0.001			
Cl		0.530	0.293	0.530	0.572	0.103	0.728	0.029	0.053	0.257	0.093		0.211
Cr	0.002	0.004	0.002	0.004	0.014	0.002	0.015	0.005	0.001	0.009			
Cu	0.020	0.015	0.022	0.015	0.018	0.014	0.022	0.023	0.014	0.014			
Fe	0.656	0.979	0.744	0.979	1.640	0.883	2.040	0.720	0.587	1.218	0.580		1.610
K	0.303	0.361	0.310	0.361	0.324	0.363	0.206	0.210	0.291	0.392			
Mg													
Mn	0.017	0.025	0.026	0.025	0.044	0.021	0.078	0.020	0.017	0.035	0.019		0.039
Mo													
Na													
Ni	0.001	0.002	0.001	0.002	0.005	0.003	0.009	0.002	0.002	0.005	0.002		0.004

6A-29

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE EASTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	1(o,q)*	1(o,q)*	2(b)*	3(ab)*	4(c)	5(d)	5(d)	6,7(p,q)	8(a,q)*	(a,q)*	8(a,q)*
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13/82	7/25-8/14/94	8/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	NR	NR	6-18-6	NR	4x daily	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	12	12	24	24	24	24
Number	12	28	50	21	98	NR	NR	354	2	1	3
P				0.042					0.033	0.025	0.042
Pb	0.111	0.061	0.303	0.032				0.405	0.681	0.462	0.119
Rb											
S	3.744	4.539	4.430	3.251				2.000	2.647	4.371	3.058
Sb				0.260							
Se	0.001	0.001	0.002					0.001	0.001	0.001	0.002
Si	0.618	0.929	1.713	1.098				1.100	4.694	6.904	1.737
Sn			BQL								
Sr			0.002								
Ti	0.018	0.017	0.065	0.030					0.096	0.154	0.021
V	BQL	BQL	0.020					0.022	0.025	0.028	
Zn	0.009	0.017	0.112	0.092					0.133	0.100	0.025

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

†Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2b (cont'd). COARSE PARTICLE COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	8(a,o)	18(k,r)	6,7(o,p)	17	6,7(o,p)	*
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81	
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24	
Duration (h)	24	24	24	24	24	24	24	24	6-12	24	24	24	
Number	1	8	6	3	7	2	14	4	5	306	311	499	
P	0.014					0.037				0.098			
Pb	0.013	0.109	0.098	0.109	0.097	0.099	0.108	0.252	0.095	0.189	0.088		0.043
Rb											0.002		
S	0.572	0.280	0.224	0.280	0.451	0.389	0.765	0.240	0.279	0.533	0.200		0.800
Sb											0.001		
Se	0.001										0.001		
Si	5.767	4.809	4.679	4.809	5.009	6.633	2.675	3.210	4.468	4.470	1.940		2.010
Sn											0.001		
Sr											0.007		
Ti	0.083	0.074	0.062	0.074	0.107	0.096	0.051	0.051	0.058	0.475			
V										0.004	BQL		0.002
Zn	0.012	0.040	0.027	0.040	0.069	0.148	0.043	0.030	0.021	0.074			

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE WESTERN UNITED STATES (μg/m³)

Ref	9(g)	9(g)	10(i)	11(j)	5(d) [*]	12(f)	8(a,q) [*]							
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	Jun. 1988	Jun. 1989	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR							
Duration (h)	4,5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
P	0.187	0.099	0.059	0.054			0.002	0.155	0.144	0.045	0.002		0.028	0.006
Pb	0.084	0.251	0.061	0.062			0.786	0.105	0.489	1.119	0.093	0.063	0.537	0.292
Rb			0.004	BQL										
S	3.353	2.262	1.463	0.615			2.888	1.422	2.373	1.109	0.571	0.573	2.371	0.952
Sb				BQL										
Se	0.008	0.010	0.001	BQL			0.001	0.001					0.001	0.001
Si	2.040	2.162	8.037	7.443			5.791	16.657	7.778	5.506	6.129	12.817	12.505	4.424
Sn				BQL										
Sr	0.018	0.024	0.014	0.014										
Ti	0.077	0.165	0.147	0.136			0.093	0.277	0.182	0.086	0.130	0.173	0.191	0.091
V	0.005	0.009	0.014	BQL			0.013	0.003	0.002	0.001			0.018	
Zn	0.114	0.293	0.094	0.090			0.147	0.032	0.059	0.105	0.019	0.026	0.119	0.093

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^{\$}Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2c. PM₁₀ COMPOSITION FOR THE EASTERN UNITED STATES (μg/m³)

Ref	1(o,q) *	1(o,q) *	2(b) *	3(ab) *	4(c)	5(d)	5(d)	6,7(p,q)	8(a,q)	8(a,q) *	8(a,q) *
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13 '82	7/25-8/14/94	8/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	NR	NR	6-18-6	NR	4x daily	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	12	12	24	24	24	24
Number	12	28	50	21	98	NR	NR	354	2	1	3
Mass	29.60	34.40	40.10	40.60				24.20	54.60	140.40	36.93
OC	2.22	0.44	2.05	4.51							
EC	1.10	1.12	2.29	0.76							
Nitrate	0.30		0.57								
Sulfate	12.00	14.38	11.20					6.50			
Acidity ^s											
Al	BQL	0.311	0.603	0.439					1.910	3.458	0.679
As	BQL		0.001							0.003	0.002
Ba											
Br	0.023	0.011	0.044	0.012				0.110	0.082	0.045	0.010
Ca	0.338	0.339	0.400	0.479				0.250	0.934	1.139	0.121
Cd			0.002								
Cl	BQL	0.189	0.072	0.073				0.389	0.302	0.301	
Cr			0.002						0.011	0.008	0.002
Cu	0.003	0.011		0.021					0.069	0.058	0.026
Fe	0.146	0.212	0.581	0.479				0.350	1.195	1.733	0.302
K	0.148	0.190	0.252	0.160					0.481	0.629	0.216
Mg				0.126							
Mn		BQL	0.017	0.010				0.009	0.028	0.030	0.006
Mo			0.001								
Na			0.146	0.206							
Ni	BQL	BQL	0.015	0.009				0.011	0.015	0.034	0.001

6A-33

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES (μg/m³)

Ref	8(a,q)*	13(q)*	14(m)	14(aa)	15(s)*	16(q)*	6,7(p,q)	17*	6,7(p,q)	6,7(p,q)	6,7(p,q)	8(a,q)*	8(a,q)*
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7 & 17	7 & 17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
Rb		0.005				<0.006							
S		0.709			1.363	4.83	2.500		2.400	1.500	1.200	1.072	2.969
Sb		<0.004			<0.059	0.006							
Se		<0.004			<0.0017	<0.003	0.002		0.002	0.001		0.003	0.001
Si		7.737			0.813	3.200	2.000		1.900	0.980	2.500	5.813	6.997
Sn		<0.004			<0.070								
Sr		0.009											
Ti		0.09			0.019	0.036						0.080	0.116
V		<0.004			<0.013	<0.045	ND	ND	ERR	ND	ND		
Zn		0.085			0.090	0.142						0.112	0.188

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE EASTERN UNITED STATES (μg/m³)

Ref	1(o,q) [*]	1(o,q) [*]	2(b) [*]	3(ab) [*]	4(c)	5(d)	5(d)	6,7(p,q)	8(a,q)	(a,q) [*]	8(a,q) [*]
Site	Smoky Mtn.	Shenandoah	Camden	Philadelphia	Deep Creek	Raleigh	Roanoke	Watertown	Hartford	Boston	Res.Tr.Pk
Dates	9/20-26/78	7/23-5/08/80	7/14-8/13/82	7/25-8/14/94	8/83	1/85-3/85	10/88-2/89	5/79-6/81	1980	1980	1980
Time	NR	NR	6-18-6	NR	4x daily	7-19-7	7-19-7	00-24	NR	NR	NR
Duration (h)	12	12	12	24	6	12	12	24	24	24	24
Number	12	28	50	21	98	NR	NR	354	2	1	3
P				0.042					0.033	0.025	0.042
Pb	0.111	0.061	0.303	0.032				0.405	0.681	0.462	0.119
Rb											
S	3.744	4.539	4.430	3.251				2.000	2.647	4.371	3.058
Sb			0.260								
Se	0.001	0.001	0.002					0.001	0.001	0.001	0.002
Si	0.618	0.929	1.713	1.098				1.100	4.694	6.904	1.737
Sn		BQL									
Sr		0.002									
Ti	0.018	0.017	0.065	0.030					0.096	0.154	0.021
V	BQL	BQL	0.020					0.022	0.025	0.028	
Zn	0.009	0.017	0.112	0.092					0.133	0.100	0.025

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,q) [*]	18(x) [*]	6,7(p,q)	17 [*]	6,7(p,q)								
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81
Time	NR	NR	NR	00-24	NR	00-24							
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24	24
Number	1	8	6	3	7	2	14	4	5	306	311	499	
P	0.014	0.013			0.059	0.080	0.060	0.018	0.020	0.099			
Pb	0.054	0.237	0.406	0.478	0.509	0.442	0.467	1.318	0.372	0.877	0.415		0.259
Rb										0.002			
S	2.632	2.031	1.131	1.043	3.870	3.265	4.471	1.754	2.612	5.188	2.300		5.500
Sb										0.007			
Se	0.002	0.001	0.001		0.008	0.005	0.005		0.002	0.005	0.002		0.005
Si	5.987	4.976	4.848	4.986	5.531	6.961	2.916	3.652	4.638	4.928	2.100		2.300
Sn										0.010			
Sr										0.009			
Ti	0.083	0.076	0.062	0.074	0.116	0.099	0.051	0.058	0.058	0.587			
V							0.001	0.002		0.006	ND		0.013
Zn	0.023	0.060	0.072	0.086	0.219	0.201	0.121	0.084	0.044	0.175			

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^{\$}Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE WESTERN UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	9(g)	9(g)	10(i)	11(j)	5(d)	12(f)	8(a,q)	8(a,q) [*]						
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	Jun. 1998- Jun. 1989	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4.5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
Mass	67.40	98.70	74.05	62.45			100.90	124.37	106.20	66.68	46.90	65.42	117.55	36.00
OC	11.61	23.35	10.59	14.56										
EC	3.19	8.49	5.62	8.30										
Nitrate	9.47	27.50	10.55	4.46										
Sulfate	11.28	5.39	3.62	2.34										
Acidity ^s														
Al	0.758	0.847	3.570	2.669			2.407	7.317	3.549	2.053	2.992	6.925	6.932	2.296
As	0.007	0.019		BQL						0.001			0.014	0.008
Ba	0.070	0.127	0.051	0.013										
Br	0.016	0.072	0.015	0.014			0.149	0.019	0.065	0.250	0.023	0.010	0.121	0.033
Ca	0.585	1.190	1.057	2.099			4.543	1.786	5.082	0.771	1.981	2.177	1.459	0.585
Cd			BQL											
Cl	1.119	0.880	0.487	0.559				0.026	0.173	0.480	1.456	0.176	0.197	0.228
Cr	0.023	0.042	0.010	0.011			0.007	0.007	0.005	0.009	0.009	0.006	0.019	0.005
Cu	0.022	0.178	0.087	0.036			0.077	0.037	0.061	0.071	0.025	0.043	0.109	0.041
Fe	0.836	2.192	1.633	1.475			1.257	3.275	2.015	1.214	1.384	1.995	2.059	1.001
K	0.237	0.460	0.820	0.876			0.441	1.437	1.081	0.508	0.665	1.200	0.805	0.231
Mg	0.335	0.287		BQL										
Mn	0.033	0.063	0.037	0.054			0.067	0.055	0.049	0.027	0.034	0.044	0.108	0.022
Mo				BQL										
Na	1.632	0.518		BQL										
Ni	0.005	0.005	0.010	0.006			0.006	0.037	0.013	0.014	0.005	0.003	0.036	0.007

6A-37

TABLE 6A-4a. SITE-TO-SITE VARIABILITY OF PM_{2.5} CONCENTRATIONS

Study Area	Denver Metropolitan		Phoenix		Philadelphia		San Joaquin Valley	
No. of Sites	3,a		3,b		4,c		6,d	
Study Dates	11/2/87 - 1/31/88		10/13/89 - 1/17/90		7/25/94 - 8/14/94		6/14/88 - 6/9/89	
Reference	14		11		3		10	
	Mean	Spread	Mean	Spread	Mean	Spread	Mean	Spread
Fine Mass	19.672	2.889	29.379	3.493	32.183	2.172	29.888	10.020
OC	7.245	0.789	10.089	2.690	4.164	0.935	4.873	2.695
EC	4.409	0.780	7.490	1.710	0.685	0.215	3.242	2.580
Nitrate	3.956	0.931	3.597	0.370			8.165	2.270
Sulfate	1.547	0.162	1.329	0.240	13.426	0.333	3.003	1.325
Al	0.037	0.006	0.131	0.015	0.114	0.009	0.152	0.055
Br	0.018	0.006	0.011	0.003	0.009	0.005	0.010	0.006
Ca	0.058	0.001	0.167	0.034	0.058	0.014	0.096	0.050
Cl	0.141	0.013	0.366	0.356	0.026	0.007	0.094	0.070
Cr	0.003	0.002	0.003	0.001			0.003	0.002
Cu	0.017	0.008	0.015	0.003	0.007	0.001	0.096	0.036
Fe	0.111	0.023	0.216	0.035	0.127	0.037	0.180	0.060
K	0.077	0.009	0.209	0.020	0.060	0.008	0.188	0.080
Mn	0.012	0.003	0.023	0.010	0.003	0.000	0.006	0.003
Ni	0.002	0.002	0.003	0.001	0.007	0.002	0.016	0.030
Pb	0.075	0.017	0.039	0.009	0.019	0.010	0.029	0.021
S	0.642	0.077	0.436	0.038	3.251	0.081	1.242	0.565
Si	0.272	0.009	0.430	0.066	0.165	0.022	0.460	0.245
Ti	0.009	0.001			0.019	0.003	0.017	0.004
V					0.041	0.018	0.078	0.027
Zn	0.031	0.008	0.056	0.030				

Mean = Mean over all sites of the average concentrations determined at each site for the sampling period.

Spread = ABS ({Highest Mean Conc. - Lowest Mean Conc.}/2) for all the sites.

a. Federal, Auraria, and Welby sites in urban Denver.

b. Central Phoenix, Scottsdale, and Western Phoenix sites.

c. Broad Street, Castor Avenue, Roxboro, and Northeast Airport sites.

d. Stockton, Crow's Landing, Fresno, Kern, Fellows, and Bakersfield sites.

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE WESTERN UNITED STATES (μg/m³)

Ref	9(g)	9(g)	10(i)	11(j)	5(d)	12(f)	8(a,q)	8(a,q) [*]						
Site	Los Angeles	Los Angeles	San Joaquin Valley	Phoenix	Boise	Nevada	Tarrant CA	Five Points CA	Riverside CA	San Jose CA	Honolulu	Winnemucca	Portland	Seattle
Dates	Summer 1987	Fall 1987	Jun. 1988 -Jun. 1989	10/13/89-1/17/90	12/86-3/87	11/86-1/87	1980	1980	1980	1980	1980	1980	1980	1980
Time	NR	NR	NR	NR	7-19-7	00-24	NR	NR	NR	NR	NR	NR	NR	NR
Duration (h)	4.5 and 7	4 and 6	24	6 h, 2x/day	12	24	24	24	24	24	24	24	24	24
Number	11 days	6 days	~35	~100 days	NR	24	6	3	4	6	1	5	4	1
P	0.187	0.099	0.059	0.054			0.002	0.155	0.144	0.045	0.002		0.028	0.006
Pb	0.084	0.251	0.061	0.062			0.786	0.105	0.489	1.119	0.093	0.063	0.537	0.292
Rb			0.004	BQL										
S	3.353	2.262	1.463	0.615			2.888	1.422	2.373	1.109	0.571	0.573	2.371	0.952
Sb				BQL										
Se	0.008	0.010	0.001	BQL				0.001	0.001				0.001	0.001
Si	2.040	2.162	8.037	7.443			5.791	16.657	7.778	5.506	6.129	12.817	12.505	4.424
Sn				BQL										
Sr	0.018	0.024	0.014	0.014										
Ti	0.077	0.165	0.147	0.136			0.093	0.277	0.182	0.086	0.130	0.173	0.191	0.091
V	0.005	0.009	0.014	BQL				0.013	0.003	0.002	0.001		0.018	
Zn	0.114	0.293	0.094	0.090			0.147	0.032	0.059	0.105	0.019	0.026	0.119	0.093

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

[§]Units for acidity are nmoles/m³.

NR = not reported.

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,q) *	13(q) *	14(m)	14(aa)	15(s)	16(q) *	6,7(p,q)	17 *	6,7(p,q)	6,7(p,q)	6,7(p,q)	8(a,q)	8(a,q) *
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Portage	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR	NR
Duration (h)	12	12	7 & 17	7 & 17	24	12	24	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10	8
Mass		56.46			28.54	63.40	32.50	30.00	35.40	18.20	26.40	76.21	72.45
OC		7.11			5.39	8.78							
EC		2.15			1.31	1.42							
Nitrate		2.22				2.22							
Sulfate		2.45			5.46	15.52	8.10	8.70		5.30	4.80		
Acidity ^s								36.1					
Al	3.294				0.269	1.216						2.903	2.508
As	<0.004				<0.0043	<0.015						0.037	0.001
Ba	0.089				<0.130	0.139							
Br	0.127				0.011	0.091	0.052		0.056	0.014	0.055	0.103	0.061
Ca	0.705				0.761	2.935	1.800		0.960	0.380	2.400	3.964	2.924
Cd	0.018				<0.041	<0.012							
Cl	1.287				0.047	0.398	0.050		0.018	0.083	0.031	0.043	0.003
Cr	<0.018				<0.0073	0.007						0.004	0.006
Cu	0.018				0.017	0.046						0.083	0.059
Fe	1.033				0.432	0.766	0.690		0.360	0.230	0.580	0.946	1.474
K	0.727				0.161	0.289						0.623	0.717
Mg					0.118								
Mn	0.031				0.013	0.035	0.038		0.027	0.009	0.020	0.027	0.078
Mo					<0.0041								
Na					0.022	<1.49							
Ni	0.008				<0.0018	0.008	0.001		ND	0.001	0.001	0.002	0.003
P	0.155				0.035	0.128							0.030
Pb	0.424				0.032	0.589	0.237		0.234	0.074	0.203	0.672	0.388

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,q) * 13(q)*	14(m)	14(aa)	15(s)	16(q)*	6,7(p,q)	17 * 6,7(p,q)	6,7(p,q)	6,7(p,q)	8(a,q)	8(a,q)*	
Site	Albuquerque	Denver	Urban Denver	Non-urban Denver	Chicago	Houston	Harriman	Harriman	Kingston	Topeka	El Paso	Inglenook
Dates	12/84-3/85	1/11-30/82	11/87-1/88	11/87-1/88	7/94	9/10-19/80	5/80-5/81	9/85-8/86	5/80-6/81	3/79-5/81	8/79-5/81	1980
Time	7-19-7	6-18-6	9-16-9	9-16-9	8-8	NR	00-24	NR	00-24	00-24	00-24	NR
Duration (h)	12	12	7 & 17	7 & 17	24	12	24	24	24	24	24	24
Number	NR	~26	~136	~150	16	20	256	330	169	271	286	10
Rb		0.005			<0.006							
S		0.709		1.363	4.83	2.500		2.400	1.500	1.200	1.072	2.969
Sb		<0.004		<0.059	0.006							
Se		<0.004		<0.0017	<0.003	0.002		0.002	0.001		0.003	0.001
Si		7.737		0.813	3.200	2.000		1.900	0.980	2.500	5.813	6.997
Sn		<0.004		<0.070								
Sr		0.009										
Ti		0.09		0.019	0.036					0.080	0.116	
V		<0.004		<0.013	<0.045	ND	ND	ERR	ND	ND		
Zn		0.085		0.090	0.142					0.112	0.188	

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES (μg/m³)

Ref	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	18(x) *	6.7(p,q)	17	6.7(p,q)
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24	24
Number	1	8	6	3	7	2	14	4	5	306	311	499	
Mass	56.90	70.33	46.35	58.43	70.90	62.95	83.32	61.55	56.82	62.00	31.40	27.60	46.50
OC													
EC													
Nitrate													
Sulfate											8.10	8.00	12.80
Acidity ^s												9.7	
Al	2.020	2.144	2.191	2.284	2.555	2.972	3.000	1.405	3.956	1.412			
As	0.002	0.003	0.005	0.010	0.015	0.013	0.009	0.039	0.004	0.003			
Ba											0.054		
Br	0.006	0.036	0.069	0.093	0.064	0.041	0.015	0.274	0.046	0.179	0.099		0.052
Ca	1.490	4.371	1.674	3.967	1.541	1.374	2.768	4.127	1.874	2.949	1.600		1.120
Cd											0.005		
Cl			0.293	0.530	0.572	0.103	0.728	0.029	0.053	0.344	0.145		0.303
Cr	0.002	0.010	0.003	0.006	0.024	0.005	0.017	0.010	0.001	0.015			
Cu	0.044	0.048	0.057	0.036	0.055	0.038	0.048	0.066	0.032	0.043			
Fe	0.727	0.989	0.831	1.119	2.249	1.057	2.711	0.968	0.663	1.493	0.770		2.200
K	0.355	0.660	0.402	0.503	0.592	0.499	0.516	0.335	0.417	0.653			
Mg													
Mn	0.018	0.026	0.031	0.031	0.129	0.032	0.111	0.035	0.019	0.071	0.040		0.068
Mo													
Na													
Ni	0.002	0.005	0.002	0.003	0.011	0.007	0.017	0.004	0.004	0.009	0.005		0.008

TABLE 6A-2c (cont'd). PM₁₀ COMPOSITION FOR THE CENTRAL UNITED STATES ($\mu\text{g}/\text{m}^3$)

Ref	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	8(a,q) *	18(x) *	6.7(p,q)	17	6.7(p,q)
Site	Braidwood	Kansas City KS	Minneapolis	Kansas City MO	Akron	Cincinnati	Buffalo	Dallas	St. Louis	St. Louis	St. Louis	St. Louis	Steubenville
Dates	1980	1980	1980	1980	1980	1980	1980	1980	1980	8-9/76	9/79-6/81	9/85-8/86	4/79-4/81
Time	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	00-24	NR	00-24
Duration (h)	24	24	24	24	24	24	24	24	24	6-12	24	24	24
Number	1	8	6	3	7	2	14	4	5		306	311	499
P	0.014	0.013			0.059	0.080	0.060	0.018	0.020	0.099			
Pb	0.054	0.237	0.406	0.478	0.509	0.442	0.467	1.318	0.372	0.877	0.415		0.259
Rb											0.002		
S	2.632	2.031	1.131	1.043	3.870	3.265	4.471	1.754	2.612	5.188	2.300		5.500
Sb											0.007		
Se	0.002	0.001	0.001		0.008	0.005	0.005		0.002	0.005	0.002		0.005
Si	5.987	4.976	4.848	4.986	5.531	6.961	2.916	3.652	4.638	4.928	2.100		2.300
Sn											0.010		
Sr											0.009		
Ti	0.083	0.076	0.062	0.074	0.116	0.099	0.051	0.058	0.058	0.587			
V							0.001	0.002		0.006	ND		0.013
Zn	0.023	0.060	0.072	0.086	0.219	0.201	0.121	0.084	0.044	0.175			

References are listed in Table 1 Appendix. Associated notes are explained in Table 1.

*Values for this size fraction are calculated from the average measured values reported for the other two size fractions.

^sUnits for acidity are nmoles/m³.

NR = not reported.

**TABLE 6A-3. SELECTED RATIOS OF PM COMPOSITION BY
GEOGRAPHIC REGION**

	EAST		WEST		CENTRAL	
	Mean	N	Mean	N	Mean	N
FM/CM	2.59	8	0.89	11	1.06	25
FM/PM ₁₀	0.65	8	0.41	11	0.51	25
Tot Carbon/FM	0.25	7	0.54	5	0.64	5
SO ₄ ⁼ /FM	0.34	12	0.11	13	0.28	28

N = number of studies contributing to the calculated ratios.

FM, CM, PM₁₀ = Mass concentrations of PM_{2.5}, Coarse fraction, and PM₁₀ respectively.

Total Carbon = (OC x 1.4 + EC).

TABLE 6A-4a. SITE-TO-SITE VARIABILITY OF PM_{2.5} CONCENTRATIONS

Study Area	Denver Metropolitan		Phoenix		Philadelphia		San Joaquin Valley	
No. of Sites	3,a		3,b		4,c		6,d	
Study Dates	11/2/87 - 1/31/88		10/13/89 - 1/17/90		7/25/94 - 8/14/94		6/14/88 - 6/9/89	
Reference	14		11		3		10	
	Mean	Spread	Mean	Spread	Mean	Spread	Mean	Spread
Fine Mass	19.672	2.889	29.379	3.493	32.183	2.172	29.888	10.020
OC	7.245	0.789	10.089	2.690	4.164	0.935	4.873	2.695
EC	4.409	0.780	7.490	1.710	0.685	0.215	3.242	2.580
Nitrate	3.956	0.931	3.597	0.370			8.165	2.270
Sulfate	1.547	0.162	1.329	0.240	13.426	0.333	3.003	1.325
Al	0.037	0.006	0.131	0.015	0.114	0.009	0.152	0.055
Br	0.018	0.006	0.011	0.003	0.009	0.005	0.010	0.006
Ca	0.058	0.001	0.167	0.034	0.058	0.014	0.096	0.050
Cl	0.141	0.013	0.366	0.356	0.026	0.007	0.094	0.070
Cr	0.003	0.002	0.003	0.001			0.003	0.002
Cu	0.017	0.008	0.015	0.003	0.007	0.001	0.096	0.036
Fe	0.111	0.023	0.216	0.035	0.127	0.037	0.180	0.060
K	0.077	0.009	0.209	0.020	0.060	0.008	0.188	0.080
Mn	0.012	0.003	0.023	0.010	0.003	0.000	0.006	0.003
Ni	0.002	0.002	0.003	0.001	0.007	0.002	0.016	0.030
Pb	0.075	0.017	0.039	0.009	0.019	0.010	0.029	0.021
S	0.642	0.077	0.436	0.038	3.251	0.081	1.242	0.565
Si	0.272	0.009	0.430	0.066	0.165	0.022	0.460	0.245
Ti	0.009	0.001			0.019	0.003	0.017	0.004
V					0.041	0.018	0.078	0.027
Zn	0.031	0.008	0.056	0.030				

Mean = Mean over all sites of the average concentrations determined at each site for the sampling period.

Spread = ABS ({Highest Mean Conc. - Lowest Mean Conc.}/2) for all the sites.

a. Federal, Auraria, and Welby sites in urban Denver.

b. Central Phoenix, Scottsdale, and Western Phoenix sites.

c. Broad Street, Castor Avenue, Roxboro, and Northeast Airport sites.

d. Stockton, Crow's Landing, Fresno, Kern, Fellows, and Bakersfield sites.

TABLE 6A-4b. SITE-TO-SITE VARIABILITY OF PM₁₀ CONCENTRATIONS

Study Area	San Jose		Phoenix		San Joaquin Valley	
	No. of Sites	2,a	No. of Sites	3,b	No. of Sites	6,c
Study Dates	12/16/91 - 2/24/92		10/13/89 - 1/17/90		6/14/88 - 6/9/89	
Reference	29		11		10	
	Mean	Spread	Mean	Spread	Mean	Spread
Fine Mass	64.950	1.650	62.465	7.064	62.920	17.280
OC	19.390	0.150	14.549	3.481	7.870	4.150
EC	9.015	0.415	8.327	1.777	3.505	2.760
Nitrate	10.900	0.600	4.459	0.452	9.437	3.015
Sulfate	2.240	0.090	1.704	0.287	3.565	1.460
Al	0.845	0.035	2.670	0.273	2.993	1.570
Br	0.012	0.001	0.014	0.003	0.012	0.005
Ca	0.670	0.049	2.096	0.317	0.950	0.390
Cl	0.728	0.032	0.559	0.349	0.388	0.225
Cr	0.003	0.001	0.011	0.002	0.009	0.003
Cu	0.029	0.002	0.036	0.009	0.084	0.046
Fe	0.834	0.027	1.475	0.170	1.413	0.445
K	0.823	0.021	0.878	0.083	0.720	0.220
Mn	0.014	0.001	0.054	0.014	0.030	0.011
Ni	0.003	0.000	0.006	0.002	0.019	0.032
Pb	0.035	0.004	0.062	0.013	0.039	0.027
S	1.147	0.091	0.615	0.041	1.472	0.605
Si	2.905	0.045	7.442	0.862	7.517	1.765
Ti	0.088	0.024	0.121	0.024	0.128	0.033
V	0.007	0.003			0.022	0.031
Zn	0.065	0.005	0.090	0.034	0.085	0.029

Mean = Mean over all sites of the average concentrations determined at each site for the sampling period.

Spread = ABS ({Highest Mean Conc. - Lowest Mean Conc.}/2) for all the sites.

a. San Carlos St. and Fourth St. sites.

b. Central Phoenix, Scottsdale, and Western Phoenix Sites.

c. Stockton, Crow's Landing, Fresno, Kern, Fellows, and Bakersfield sites.